CLAIMS

[1] An input voltage detection method, for a PWM cycloconverter that is a power converter wherein individual phases of three-phase AC power are directly connected to

5 individual phases of a three-phase output of the power converter by employing a bidirectional semiconductor switch that is formed by combining two unidirectional semiconductor switches, to which a current is supplied only in one direction and which are capable of independently being turned on and off,

10   the input voltage detection method comprising the steps of:

      detecting a phase of the three-phase AC power;

      employing the phase of the three-phase AC power and the detected phase of an input power voltage to detect an artificial

15 DC bus voltage that represents a magnitude of the three-phase AC power as a difference between a maximum value and a minimum value;

      calculating an ideal input voltage value by using an effective value of the detected artificial bus voltage and the

20 phase of the input voltage;

      calculating a permissible width defined by an upper limit and a lower limit relative to the ideal input voltage value thus calculated;

      comparing a voltage value of the detected artificial DC

25 bus voltage with the obtained permissible width defined by the

upper limit and the lower limit; and

adjusting the voltage value of the detected artificial DC bus voltage within the obtained permissible width defined by the upper limit and the lower limit.

5 [2] The input voltage detection method, for a PWM cycloconverter, according to claim 1, further comprising the step of:

detecting an abnormality of an input voltage of the three-phase AC power based on the detected artificial DC bus

10 voltage and the detected phase of the input power voltage.

[3] An input voltage detection apparatus, for a PWM cycloconverter that is a power converter wherein individual phases of three-phase AC power are directly connected to individual phases of a three-phase output of the power

15 converter by employing a bidirectional semiconductor switch that is formed by combining two unidirectional semiconductor switches, to which a current is supplied only in one direction and which are capable of independently being turned on and off,

the input voltage detection apparatus comprising:

20 an input power voltage phase detector, for detecting a phase of the three-phase AC power;

an artificial DC bus voltage detector, for employing the three-phase AC power and the phase detected by the input power voltage phase detector to detect an artificial DC bus voltage

25 that represents a magnitude of the three-phase AC power as a

difference between a maximum value and a minimum value;

an ideal input voltage calculator, for calculating an ideal input voltage value based on an effective value of the artificial bus voltage and the phase of the input voltage;

5   an input voltage upper and lower limit calculator, for calculating a permissible width defined by upper and lower limits for the obtained ideal input voltage value; and

a voltage comparator, for comparing a voltage value detected by the pseudo DC bus voltage detector with the

10   permissible width defined by the upper and lower limits, which are obtained by the input voltage upper and lower limit calculator,

wherein an output of the voltage comparator is adjusted, so that a voltage value detected by the artificial DC bus

15   voltage detector falls within the permissible width defined by the upper and lower limits, which are obtained by the input voltage upper and lower limit calculator.

[4]   The input voltage detection apparatus, for a PWM cycloconverter, according to claim 3, further comprising:

20   a power abnormality detector, for detecting an abnormality in the three-phase AC power based on an output of the artificial DC bus voltage detector and an output of the input power voltage phase detector, so that an abnormality in the input voltage is detected.

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